UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/654,093	08/31/2000	Randhir P.S. Thakur	94-0302.02	5663

7590 02/26/2003

Charles Brantley
MICRON TECHNOLOGY INC
8000 S Federal Way
Mail Stop 525
Bosie, ID 83716

EXAMINER
BROCK II, PAUL E

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 02/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 16

Application Number: 09/654,093
Filing Date: August 31, 2000
Appellant(s): THAKUR ET AL.

Charles B. Brantley II
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed November 25, 2002.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 52 – 64 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,372,974	Doan et al.	12-1994
5,084,407	Boland et al.	1-1992
5,468,689	Cunningham et al.	11-1995

5,384,288	Ying	1-1995
5,132,239	Ghezzi et al.	7-1992
4,976,856	Van Der Scheer et al.	12-1990

(10) Grounds of Rejection

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

The term "generally" in claim 60 is a relative term which renders the claim indefinite. The term "generally" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is not clear how insulative, conductive or laterally coextensive anything preceded by the term "generally" is in this claim (i.e. "generally insulative material", "generally conductive element", "generally laterally coextensive"). Does generally laterally coextensive mean that the generally conductive element is laterally coextensive for the entire length of the generally insulative material, or is the generally conductive element only laterally coextensive with a portion of the length of the generally insulative material.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doan et al. (USPAT 5372974, Doan) in view of Boland et al. (USPAT 5084407, Boland).

Doan discloses a method of processing a semiconductor device in figure 6.

With regard to claim 52, Doan discloses in figure 6 depositing a dielectric layer (50) over a semiconductor substrate. Doan discloses in figure 6 and column 4, lines 28 – 44 allowing electrically chargeable particles to occur in the dielectric layer, because the dielectric layer is tetraethylorthosilicate ("TEOS"). Doan discloses in figure 6 and column 4, lines 28 – 44 allowing some diffusion of the electrically chargeable particles, because the dielectric layer is TEOS. Doan discloses in figure 6 and column 4, lines 17 – 20 preventing at least some of the electrically chargeable particles from reaching the substrate, because of the silicon nitride barrier layer (40). Doan does not disclose that the substrate comprises a plurality of electrically conductive regions and an electrically insulative region therebetween. Boland discloses in figure 2 a substrate that comprises a plurality of electrically conductive regions (22) and an electrically insulative region (12) therebetween. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the substrate of Boland in the method of Doan in order to provide a planar surface of isolated areas and active areas that allow semiconductor devices to be smaller, denser and have a larger number of layers that are vertically stacked as stated in the abstract and column 1, lines 9 – 29 of Boland.

Claims 53 – 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doan in view of Cunningham et al. (USPAT 5468689, Cunningham).

With regard to claim 53, Doan discloses in figure 6 and column 4, lines 28 – 44 depositing a dielectric layer (50) over a semiconductor substrate, wherein the step of depositing a dielectric layer of TEOS comprises depositing a dielectric layer using an organic precursor.

Doan discloses in figure 6 and column 4, lines 28 – 44 allowing electrically chargeable particles to occur in the dielectric layer, wherein the step of allowing electrically chargeable particles to occur in the dielectric layer comprises allowing an organic component of the organic precursor to deposit in the dielectric layer, because the dielectric layer is TEOS. Doan discloses in figure 6 and column 4, lines 28 – 44 wherein a feature at the molecular level is allowing some diffusion of the electrically chargeable particles, because the dielectric layer is TEOS. Doan discloses in figure 6, column 3, lines 60 – 68 and column 4, lines 1 – 44 preventing at least some of the electrically chargeable particles from reaching the substrate, wherein the preventing step comprises layering a barrier of silicon nitride (40) over the substrate using plasma processing prior to the step of depositing a dielectric layer. Doan is silent in teaching that the plasma-processing step used to deposit the barrier uses a non-organic precursor. Cunningham teaches in the abstract depositing a layer of silicon nitride using a non-organic precursor in a plasma process. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the non-organic precursor process of Cunningham in the method of Doan in order to form a barrier layer that can withstand oxide desorption at temperatures in excess of 900 degrees Centigrade as taught by Cunningham in column 1, lines 44 – 45.

With regard to claim 54, Cunningham discloses in the abstract that the plasma processing layering step comprises layering a barrier using silane.

With regard to claim 55, Doan discloses in figures 4 – 6 a method of at least partially forming a circuit device. Doan discloses in figures 4 – 6 providing a semiconductor substrate (30). Doan discloses in figures 4 – 6 layering a barrier (40) on the substrate. Doan discloses layering a carbon-containing dielectric layer on the barrier, because the dielectric is TEOS.

Doan does not disclose that the barrier is carbon-free. Cunningham teaches a method of layering a carbon-free barrier on a substrate in the abstract. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the carbon-free barrier method of Cunningham in the method of Doan in order to form a barrier layer that can withstand oxide desorption at temperatures in excess of 900 degrees Centigrade as taught by Cunningham in column 1, lines 44 – 45.

With regard to claim 56, Cunningham discloses in the abstract that the step of layering a carbon-free barrier on the substrate further comprises layering the carbon-free barrier using a plasma.

With regard to claim 57, Doan discloses further comprising a step of heating the carbon-containing dielectric in column 4, lines 44 and 45.

Claims 58 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doan and Cunningham as applied to claims 55 – 57 above, and further in view of Ying (USPAT 5384288).

With regard to claim 58, Doan and Cunningham are silent to the teaching the step of heating the carbon-containing dielectric comprises raising a temperature to a range of 850C – 1050C for at least 5 seconds. Ying teaches in column 4, lines 18 – 22 the step of heating a carbon-containing dielectric comprising raising a temperature to a range of 850C – 1050C for at least 5 seconds. While Ying teaches a few seconds and not directly at least 5 seconds it would be apparent to the skilled artisan that at least 5 seconds in the rapid thermal anneal environment of Ying would result in a sufficient anneal. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the rapid thermal anneal of Ying in the method of Doan and Cunningham in order to reflow the carbon containing dielectric layer with a process

using a low reflow temperature that has less of a probability of damaging the circuit beneath as stated by Ying in column 4, lines 18 – 33.

With regard to claim 59, Doan and Cunningham do not directly disclose the step of heating the carbon-containing dielectric comprises raising a temperature to a range of a range of 750C-1000C for at least 5 minutes. Ying teaches in column 4, lines 18 – 22 the step of heating a carbon-containing dielectric comprising raising a temperature to a range of 750C-1000C for at least 5 minutes. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the steam ambient anneal of Ying in the method of Doan and Cunningham in order to reflow the carbon containing dielectric layer with a process using a low reflow temperature that has less of a probability of damaging the circuit beneath as stated by Ying in column 4, lines 18 – 33.

Claims 60, 61, 63 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doan in view of Ghezzi et al. (USPAT 5132239, Ghezzi).

With regard to claim 60, Doan discloses a method of processing a substrate in figures 4 – 6. Doan discloses in figure 5 depositing an oxide charge barrier over the substrate (silicon nitride). Doan discloses in figure 6 depositing a generally insulative material (TEOS) over the oxide charge barrier, wherein the generally insulative material is less insulative that the barrier. Doan does not disclose a substrate comprising two active areas and an intervening insulating region, and providing a generally conductive element. Ghezzi teaches in figure 3 a substrate (2) comprising two active areas and an intervening insulating region and providing a generally conductive element (5) over a generally insulative material (21), wherein the element is generally

laterally coextensive with the intervening insulating region. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the active areas and generally conductive element of Ghezzi in the process of Doan in order to form a floating gate for an EEPROM memory cell which will have several advantages over older technology both in efficiency and reliability as stated by Ghezzi in column 1, lines 40 – 46, column 3, lines 31 – 40 and 55 – 56 and column 4, lines 1 – 27.

With regard to claim 61, Doan discloses in column 4, line 43 the step of depositing a generally insulative material comprises depositing a generally insulative material that is allowed to comprise oxide charges.

With regard to claim 63, Doan discloses in figure 6 and column 4, lines 44 and 45 annealing the generally insulative material. Doan discloses in figure 6 and column 4, lines 44 and 45 allowing an oxide charge in the generally insulative material to migrate toward the substrate in response to the annealing step, because the generally insulative material is TEOS. Doan discloses in figure 6 and column 4, lines 17 – 20 intercepting the oxide charge with the oxide charge barrier before the oxide charge reaches the substrate, because the oxide charge barrier is silicon nitride.

With regard to claim 64, Doan discloses in figure 6 refraining from depositing any generally conductive material before the step of depositing a generally insulative material.

Claim 62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doan and Ghezzi as applied to claim 60 above, and further in view of Van Der Scheer et al. (USPAT 4976856, Van Der Scheer)

Doan and Ghezzi are silent in the teaching plasma treating the substrate. Van Der Scheer teaches in column 1, lines 28 – 32 plasma treating a substrate. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the plasma treating method of Van Der Scheer to treat the substrate in the method of Doan and Ghezzi in order for the preparation of non-porous (i.e. dense) membrane layers that have a much higher ability to allow select transport of molecular species as stated by Van Der Scheer in column 3, lines 8 – 20.

(11) Response to Argument

With regard to the Appellant's argument that "Applicant's previous arguments and the Examiner's previous admission support definiteness," it should be noted that in order to support definiteness support for the claim limitation must be found in the specification. The claim limitations which are not definite are: "a generally insulative material"; "a generally conductive element"; and "generally laterally coextensive." The Appellant states that "Applicant's have already presented counter arguments in the Amendment and Response to the Office Action dated 9/4/01... In summary, Applicants pointed out support in the Specification for those terms and provided relevant dictionary definitions, which indicate the ability of one of ordinary skill in the art to ascertain the requisite degree indicated by the term 'generally'." The relevant passages from the Amendment and Response to the Office Action dated 9/4/01 are: "the Specification provides non-limiting yet supporting examples of a "generally insulative material" in the form of a dielectric layer incorporating an oxide charge and a contaminant; wherein the dielectric layer may be BPSG, BSG, PSG, or silicon oxide; the oxide charge may be positive or negative; and the contaminant may be carbon. As a result the Specification provides further guidance to one of

ordinary skill in the art at to what a "generally insulative material may be." On the contrary, the Appellant has failed to point to any section of the originally filed specification that recites "generally insulative" and attempts to set the meets and bounds of the terms by way of argument rather than the Specification. If the Appellant had pointed out where in the Specification support for a "generally insulative material" had specifically been recited, the rejection would have been withdrawn. However, no such attempt to point to the support has been made, and the rejection is therefore deemed proper. Hence, the arguments are not persuasive.

Further, regarding the phrase "generally conductive element" the Appellant attempted to set forth similar arguments to build support for what a conductor is, and how this might relate to an element being defined as "generally conductive." It should be pointed out that the Appellant, while taking great strides to define "generally conductive element" in the arguments, has not pointed to a single passage of the Specification which attempts to define the term. It is therefore not clear how one of ordinary skill in the art would pick and choose through the Appellant's own Specification to find or determine what originally disclosed "element" might actually be considered "generally conductive." Therefore, even though the Specification might give examples of what might be a conductor in the Appellant's invention, there is nothing that points to the definition of what materials will makeup the "generally conductive element" of the Appellant's claim limitations. Hence, the arguments are not persuasive and the rejection is proper.

Similarly, regarding the phrase "generally laterally coextensive" the Appellant has failed to specifically point out where in the Specification any support for this phrase exists. As argued above, how can one of ordinary skill in the art be expected to know what the in the Appellant's

actual claims is covered by "generally laterally coextensive" if there is no specific recitation in the Specification. In fact, it would not only take the dictionary definitions of the words generally, laterally, and coextensive to understand what meets and bounds the Appellant is trying to claim, but it would take unnecessary and impractical interpolation of the claim language, as compared to what is defined in the Specification, to justify the scope of what the Appellant is intending to claim. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

With regard to the Appellant's lengthy and heavy citation of "Case precedent supports definiteness," clearly the Appellant is trying to construe the case precedent to show that there need not be support in the specification of a phrase or definition that can be gleaned from research into a dictionary and knowledge held by the ordinary artesian. However, a relevant quote from the Appellant is noted as "As to whether such an artisan would be so apprised, case precedent stresses that the specification plays a part in guiding one of ordinary skill in the art." This seems to go against the Appellant's position. A guide should make reference to the terms or phrases which it intends to define. Clearly the Appellant has not pointed to any place in the Specification "plays a part in guiding one of ordinary skill in the art" to the meets and bounds of the claimed limitations. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

With regard to the Appellants arguments regarding "Pertinent prior art supports definiteness" it should be noted that support for a term or phrase in a patent or specification not belonging to the Specification or claims at issue does little to show examples of what is meant by that term or phrase as is currently meant. Clearly, Payne shows what is meant by "lateral

coextensivity" in FIGS. 2A and 2B of U.S. pat. No. 5,041,809 as it relates to the invention, Specification and claims of Payne. Nowhere in the Appellant's Specification is Payne's definition of "lateral coextensivity" mentioned or referred. Neither is reference made to the definition provided by Radwanski (USPAT 4767586). Clearly the Appellant is attempting to claim a definition provided in a patent that is not presently at issue. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

Similarly, with regard to the phrases "generally insulative" and "generally conductive," the Appellant cites of Chapman (USPAT 5,087,589) and Herdon (USPAT 4843034). While Chapman and Herdon go to great lengths to discuss resistivities that define what is encompassed by their specification, a quick review of the present Specification will prove that no such attempt has been made by the Appellant. Neither has the Appellant made reference to Chapman and Herdon in the Specification. Therefore, no definition of the meets and bounds of "generally insulative" and "generally conductive" has been provided in the present Specification to aid the ordinary artesian in determining the scope of the present claim. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

With regard to the Appellant's arguments citing "Analogy between case precedent and the facts on appeal support definiteness," it should be noted that taken in context of what has been presented by argument within the "case precedent and the facts on appeal" the Appellant is correct on the conclusion of definiteness support. However, as shown by the Appellant, definiteness in a claim limitation as provided by U.S.C. section 112 "requires no more than what is already in the Specification and claims." In this case, as has been shown above, nothing with regards to the meets and bounds of the claim language of "generally insulative material,"

"generally conductive element," and "generally laterally coextensive" has been attempted to be defined in the specification. The ordinary artisan would not be knowledgeable about what the Appellant intended these terms to mean in regard to the claimed invention. Definiteness has not been provided in light of Appellant's originally filed Specification, but has only been defined in arguments as shown in the "case precedent and the facts on appeal". Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

With regard to the Appellant's argument's regarding "The Examiner has failed to meet the burden for rejection based on a combination of Doan and Boland," as will be set forth below, the rejections, repeated above and presented in the Office Action dated August 21, 2002 based on 35 U.S.C section 103, meet "the burden for rejection based on a combination of Doan and Boland."

With specific regard to the Appellant's arguments regarding "The examiner's citation of Doan does no support the Examiner's argument," it is first necessary to understand what the Appellant has actually disclosed as the invention in the originally filed specification. On page 2, lines 6 – 20 of the originally filed Specification "It is well known in the art of semiconductor fabrication that dielectric layers formed from organic sources can have shifts in their threshold voltage due to impurities in the dielectric material. The impurities are present in the layer because of the organic processes, such as ozone-TEOS based chemistry, which are used to form the material of the dielectric layer. It is also known for the impurities in the dielectric layer to diffuse and collect at interfaces close to the substrate during high temperature processing steps performed after deposition of dielectric material formed with organometallic precursors." It is further disclosed on page 7, lines 7 – 29 and in figures 1 and 3 "It is well understood that silicon

atoms must react with oxygen in order to form the BPSG, BSG, PSG or other material of the dielectric layer 20. The contamination of the dielectric layer 20 can thus occur due to the use of organometallic precursors that can be used to provide the boron, phosphorus, silicon and oxygen atoms of the BPSG of the dielectric layer 20. For example it is known to form the BPSG material of the dielectric layer 20 by reacting ozone with organic precursors such as... in order to provide the required boron, phosphorous, and silicon atoms. Each of these molecules is an organic molecule containing carbon atoms. The contamination due to the carbon of the organic molecules remains in the BPSG dielectric layer 20 after the reactions forming the BPSG material and cause impurities in the BPSG layer 20. Furthermore, it will be understood that contamination can arise in any other way from the organic precursors and from any other sources." Therefore, it can now be shown that the Appellant's arguments citing "the structure illustrated in [Doan] ... disclosed properties such as (1) allowing electrically chargeable particles to occur in a dielectric layer; (2) allowing some diffusion of the electrically chargeable particles; and (3) preventing at least some of the electrically chargeable particles from reaching a substrate... Applicant's contend that a careful reading by the Board of Doan's cited figure and text will reveal no such disclosure." A clear interpretation of the originally filed Specification requires only that a dielectric layer be formed of an organometallic process (such as ozone-TEOS based chemistry) to have electrically chargeable particles that can diffuse through the dielectric layer. It can only be concluded from this that if any organic method of formation is used for the dielectric layer, an electrically chargeable particle within the layer would be allowed to diffuse there through. Hence, it should be acknowledged that the claim language only permits a layer that allows "electrically able particles to occur." Doan's disclosure in figure 6 and column 4, lines 17 – 20

and 28 – 44 that the dielectric layer (50) is TEOS. TEOS is tetraethylorthosilicate which is an organic dielectric layer. Thus a disclosure of TEOS is sufficient to support "allowing electrically chargeable particles to occur in a dielectric layer." So now that it has been shown that a TEOS layer is provided by Doan which allows "electrically chargeable particles to occur," it follows from the above recitation of the Appellant's originally filed Specification that "some diffusion of the electrically chargeable particles" would be allowed to occur. Finally, another section of the Appellant's originally filed Specification states on page 9, lines 27 – 29 "Additionally the barrier layer 30 can be a nitride film which can be formed using plasma technology or using non-plasma technology." Doan clearly discloses in figure 6, and column 4, lines 1 – 6 and 17 – 20 that barrier layer (40) is a silicon nitride layer formed by plasma processing. Therefore, it is now clear that Doan discloses "preventing at least some of the electrically chargeable particles from reaching a substrate" by use of the silicon nitride layer. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

As can be seen above, any argument which the Appellant has provided regarding "teachings deemed by the Examiner to be inherent" are only attempts to dissuade the Honorable members of the Board from realizing what the Appellant disclosed in the originally filed Specification. As shown in the preceding paragraph the rejections rely on what the originally filed disclosure teaches as "well known" properties of certain dielectric layers (organically formed). Therefore no inherency argument needs to be presented based on the material properties that are well known. For example, Doan's disclosure of a TEOS dielectric layer allows for the presence of electrically chargeable particles, not because of inherency, but because

of the Appellant's written Specification. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

Appellant's arguments concerning the combination of Doan and Boland only serve to confuse the actual issue at hand. As is noted in the rejection above and in the Final office action "Doan does not disclose that the substrate comprises a plurality of electrically conductive regions and an electrically insulative region therebetween. Boland discloses in figure 2 a substrate that comprises a plurality of electrically conductive regions (22) and an electrically insulative region (12) therebetween. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the substrate of Boland in the method of Doan in order to provide a planar surface of isolated areas and active areas that allow semiconductor devices to be smaller, denser and have a larger number of layers that are vertically stacked as stated in the abstract and column 1, lines 9 – 29 of Boland." As can be seen by this rejection, only Boland's substrate is used in the rejection. Basically, Boland's substrate is the entire figure 2, and this is being used in Doan's figure 6 to replace the substrate 30. Appellant construes the teaching of Boland to suggest that Boland would only ever planarize by CMP, while Doan teaches a reflow process for planarization. The disclosure in Boland in column 3, line 50 – column 4, line 14 teaches that CMP planarization is used to create the flat surface of figure 2. Nothing in Boland teaches or suggest further processing that would be limited to CMP. Thus, there is nothing limiting a process of Doan using the substrate of Boland. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

Appellant's arguments regarding "thermal budget concerns" is not persuasive due to their context. Doan's discussion of thermal budget does not concern the proposed combination as it

relates to the substrate of Boland. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

Also, "the mechanical aspects of Boland's CMP may very well expose at least one of Doan's layers to stresses having a result similar to one that Doan seeks to avoid," is a speculative argument raised by the Appellant. Never is there any suggestion in the rejection of polishing Doan's layers by CMP. Therefore, the ascertation that Boland's process will pose any harm to Doan's invention is not persuasive. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

Appellant's argument attacking the motivation for the combination between Doan and Boland are not in the least convincing. By stating that "one of ordinary skill in the art would be led to believe that (1) Boland itself satisfies that [to provide a planar surface of isolated areas and active areas that allow semiconductor devices to be smaller, denser and have a larger number of layers that are vertically stacked as stated in the abstract and column 1, lines 9 – 29 of Boland] need; and (2) given the conflicts articulated above, attempts at combining Boland with Doan risks frustrating that need and perhaps actively countering it." For the second point, please refer to the above arguments. The first point, however, is simply not convincing. Because Doan does not provide active areas in the substrate 30 of figure 6, there is no way Doan satisfies "that need". Therefore, the proposed combination is motivating based on the need for active areas to create a working semiconductor surface in Doan. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

In response to Appellant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on

obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Appellant's disclosure, such a reconstruction is proper. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper. As can be seen by the combination in order to make semiconductor devices in Doan, active areas of Boland must be formed. Therefore, knowledge is not gleaned only from the Appellant's disclosure. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

Appellant's argument's regarding the combination of Doan with Cunningham suffers from the same problems associated with the arguments regarding Doan and Boland. As stated above, the rejection is not based on inherency in Doan, but on materials possessing well known properties as disclosed in the Appellant's own Specification. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

With regard to the Appellant's argument stating that Doan teaches an unnecessary redundancy that would make the proposed combination of Doan and Cunningham discouraging, it should be noted that nothing in Cunningham says that the additional layer of Doan is counterproductive to the invention. Further, this is a moot point based on what Cunningham actually adds to Doan as taught in the Final Office action and repeated above as "Cunningham teaches a method of layering a carbon-free barrier on a substrate in the abstract. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the carbon-free barrier method of Cunningham in the method of Doan in order to form a barrier layer that can withstand oxide desorption at temperatures in excess of 900 degrees Centigrade as

taught by Cunningham in column 1, lines 44 – 45." As can be seen, Cunningham contributes a method for forming a type of barrier layer as a way to form the barrier layer of Doan. There is nothing that Doan adds to Cunningham and therefore the Appellant's arguments with that respect are confusing and ill advised. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

While the examiner is required to "consider a references teaching as a whole" there is no requirement to consider all possible combinations of the two references that would make devices and processes that are not related to the claimed invention. The Appellant is again trying to draw attention away from the rejection actually made. Simply, the Appellant's continued use of made up embodiments or combinations, that have little if anything to do with the actual proposed combination, only serve to force confusion in the issues that are actually at hand. The "conflicts" to which the Appellant keeps referring to are fabrications that are not relevant to the proposed combinations. All of the legally required aspects of 103 obviousness type rejections have been made. Because the Appellant can think up some oft-construed embodiment of the proposed combination and attack it for something its not, does not prove that the examiner has acted in a "legally improper" way. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

With regard to the Appellant's arguments that "Specifically, Cunninghan (Cunningham) touts a barrier layer that can withstand successful growth of gallium arsenide," it should be noted that Cunningham states in column 1, lines 43 – 45 "the [silicon] nitride barrier layer must evidence sufficient mechanical stability to withstand oxide desorption at temperatures in excess of 900 degrees Centigrade which are necessary for the successful growth of gallium arsenide on

silicon without effecting cracking or loss of adhesion." Even though the growth of gallium arsenide is not required in Doan, the ability to withstand temperatures of 900 degrees centigrade is relevant to Doan during the reflow as stated in column 4, lines 13 – 15 of Doan. It should further be noted that the silicon nitride of Doan and Cunningham (40 in figure 6 of Doan) is directly deposited on silicon (30). Cracking or loss of adhesion of the silicon nitride layer at temperatures above 900 degrees Celsius are two major problems that would inhibit the method of Doan, and a silicon nitride barrier layer that can withstand these conditions without cracking or loss of adhesion is very desirable. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

Doan and Cunningham lack disclosure of a time for the planarization reflow step of a carbon containing dielectric layer. Ying teaches this reflow time. Once again the Appellant attempts to divert attention away from this actual combination. While Ying might teach creating an internal stress in a layer that is reflowed using an element not relied upon in the combination of Doan, Cunningham, and Ying, this has nothing to do with the teaching of time for reflow that is gleaned from Ying. Further, the discussion of where a nitride barrier might exist on the features of Cunningham and Ying again detracts from the rejection actually made. Appellant states that "Cunningham's disclosed test data indicates that such temperatures are sustained for an hour. (Cunningham col. 4, ln. 14 – 16; table 1.)" These testing parameters have nothing to do with the proposed combination. Nowhere is "testing" mentioned in the claims, and is irrelevant to the rejection Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

With regard to the Appellant's statement "The Examiner has previously admitted failure to abide by case precedent," it is not clear where this previous admittance is in any of the Office actions. It should be noted that no admission as such has been presented. However, it should be noted that the Examiner has not misconstrued the references in all and every possible combination with each other, as has been done by the Appellant. A proper realization to "consider a reference as a whole" should not take into consideration facts about the references that clearly have nothing to do with the proposed combination. For example, when a reference is relied upon for a certain time of a process step to make a particular layer on a semiconductor wafer, the testing of the finished, singulated semiconductor chip does not need to be taken into consideration. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

It is not clear why a motivation to combine Ying with Doan and Cunningham can be proven "untenable" by arguments against the references individually. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. Ying provides the motivation for the rejection "It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the steam ambient anneal of Ying in the method of Doan and Cunningham in order to reflow the carbon containing dielectric layer with a process using a low reflow temperature that has less of a probability of damaging the circuit beneath as stated by Ying in column 4, lines 18 – 33," and this clearly has nothing to do with Cunningham's brief mention of reflow (Cunningham is used for a method of forming a nitride layer), or the stresses discussed in Ying or Doan (these stresses are independent of each other, and the stress of Ying would never come into play in the proposed

rejection). This argument is not relevant to the rejection actually made. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

The Appellant again insists that "The Examiner has misapplied Doan," this is supported by a statement that "While Doan's text indicates that film 40 may be titanium nitride, the Examiner has failed to cite support in the record addressing either of Doan's structures 30 or 40 having the property of an oxide charge barrier." First, it should be pointed out that the rejection states, "With regard to claim 60, Doan discloses a method of processing a substrate in figures 4 – 6. Doan discloses in figure 5 depositing an oxide charge barrier over the substrate (silicon nitride)," (also see Doan, column 4, lines 17 – 27) and the Appellant's originally filed Specification states "the barrier layer 30 blocks diffusion of the impurities," and "Additionally, the barrier layer 30 can be a nitride film," (see the Specification on page 9, lines 18 – 30). The Appellant's mention of titanium nitride is ill founded because the examiner never made reference to titanium nitride. The property of silicon nitride being an oxide charge barrier is found in the Appellant's Specification. Nothing about the nitride layer of Doan differs from that disclosed by the Appellant, and therefore Doan's nitride layer must have the property of an oxide charge barrier. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

With regard to the Appellant's discussion of "the Examiner's misinterpretations of Doan stems from the Examiner's argument that Doan discloses depositing an insulative material that is less insulative than an underlying barrier," in considering Doan as a whole, any embodiment wherein the insulative material disclosed that is less insulative than an underlying barrier, reads on the claim limitations. It is suggested in the rejection that TEOS is less insulative than silicon nitride. Insulativeness is a measure of conductivity. While the conductivity measurements have

not been provided by the Appellant it is noted that TEOS is a material formed by ozone-TEOS based chemistry. The Appellant's Specification states that the insulative layer is a layer formed by ozone-TEOS based chemistry. Also, as stated above, the Specification states that the barrier layer is the barrier layer of nitride. The only conclusion which can be drawn from the Appellant's own Specification and claims is that an insulative layer formed by ozone-TEOS based chemistry is less insulative than a layer of nitride. Therefore, Doan reads on these limitations. The Appellant's arguments are not persuasive, and the rejection is proper.

With regard to the Appellant's ascertation that Ghezzi is misinterpreted, the Appellant has not explained why the generally conductive layer is not allowed to extend over another feature of a structure while still being generally laterally coextensive with the generally insulating region. The issue is whether the generally conductive layer (22) is generally laterally coextensive with the generally insulating region (21) in figure 3 of Ghezzi. The generally lateral coextensivity of one layer to another is independent of those layers interactions with other adjacent layers. The Appellant's arguments are not persuasive, and the rejection is proper.

The Appellant states "the Examiner further interpreted Doan as disclosing refraining from depositing a conductive material before depositing an insulative material." What was actually stated in the rejection at issue is "Doan does not disclose a substrate comprising two active areas and an intervening insulating region, and providing a generally conductive element [over the generally insulative material]." Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

With regard to Appellant's arguments against the motive to combine Doan and Ghezzi, it should be noted that arguments against the references individually are not persuasive. As stated

in the rejection, "Ghezzi teaches in figure 3 a substrate (2) comprising two active areas and an intervening insulating region and providing a generally conductive element (5) over a generally insulative material (21), wherein the element is generally laterally coextensive with the intervening insulating region." Even though the Appellant attempts to make an issue of the relative thickness of the layers, there is nothing in the claims that suggests that thickness of the generally insulative material is claimed. Also, Ghezzi's lack of discussion regarding planarity is not an issue in the claims either. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

With regard to Appellant's arguments regarding the combination of Doan, Ghezzi, and Van Der Sheer, it should be noted that the Appellant has again construed any possible combinations of the three references to show that they would not be compatible. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

Finally, the Appellant appears to raise a variety of issues that have no bearing on the claimed invention or the rejection at hand. If the Appellant believed that an improper course of action was taken with this case, it should have been mentioned prior to Appeal, and brought up through petition.

Instead of arguing the claims in light of the Specification, the Appellant has argued the references in light of themselves. The Specification, not arguments, should support the claims. It has been shown that the rejections are relevant to the claims. Therefore, the Appellant's arguments are not persuasive, and the rejection is proper.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Paul E Brock II
February 21, 2003

Conferees
Eddie Lee

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Olik Chaudhuri

CHARLES BRANTLEY
MICRON TECHNOLOGY INC
8000 S FEDERAL WAY
MAIL STOP 525
BOSIE, ID 83716